(19) World Intellectual Property Organization International Bureau



(43) International Publication Date 12 May 2005 (12.05.2005)

PCT

(10) International Publication Number WO 2005/043787 A1

- (51) International Patent Classification⁷: G01B 9/02
- H04K 1/00,
- (21) International Application Number:

PCT/AU2004/001476

- (22) International Filing Date: 27 October 2004 (27.10.2004)
- (25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data: 2003905969 29 C

29 October 2003 (29.10.2003) AU

- (71) Applicant (for all designated States except US): UNISEARCH LIMITED [AU/AU]; Rupert Myers Building, Level 2, Gate 14, Barker Street, UNSW, Sydney, NSW (AU).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): RALPH, Timothy, Cameron [AU/AU]; 4/139 Central Avenue, Indooroopilly, QLD 4068 (AU). HUNTINGTON, Elanor, Harriet [AU/AU]; 66 Bargang Crescent, Ngunnawal, ACT 2913 (AU).

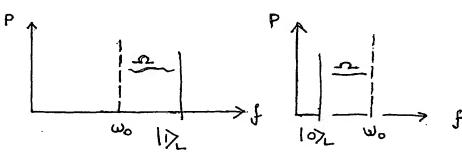
- (74) Agent: F B RICE & CO; 605 Darling Street, Balmain, NSW 2041 (AU).
- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: COMPONENTS FOR OPTICAL QUBITS IN THE RADIO FREQUENCY BASIS



(57) Abstract: The invention is in the field of optical quantum information processing. This invention concerns the manipulation of single photon qubits in frequency modes, and in particular a frequency beamsplitter and a frequency half-wave plate for use in the frequency basis. The frequency beamsplitter comprises: An asymmetric two-path interferometer, reversible down to the quantum lirait. A first partially transmitting mirror to split photons into first and second paths. A time delay element to introduce a differential time delay into the second path. And a second partially transmitting mirror to mix the two paths again to fonn two outputs. The half -wave plate utilizes two of the beam splitters.